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Error but No Fraud, NIH Panel Rules on Hotly Disputed Paper

The expert panel that investigated charges of "misrepresentation or other misconduct" in a research paper co-authored by Nobel laureate David Baltimore reported last week that it found "serious errors of misstatement and omission, as well as lapses in scientific judgment and interlaboratory communication." It added, however, that "no evidence of fraud, conscious misrepresentation, or manipulation of data was found." And it recommended that "no further action was required" beyond publication of corrections.

Those are the major conclusions in a confidential draft that SGR has obtained of a report to the National Institutes of Health by the panel of immunologists specially appointed to investigate the case: Joseph M. Davie, of Searle Pharmaceuticals; Hugh McDevitt, Stanford University, and Ursula Storb, University of Chicago. The draft report has not been released and is subject to changes following comments by the parties involved in the angrily disputed case.

The Black Hole of Physics Education—P. 4
DOE Research Termed Fraud Proof—P. 8

The findings on scientific points in large part vindicate the assertions of the former MIT postdoctoral fellow, Margot O'Toole, who says her scientific career was derailed when she privately raised questions about the accuracy of parts of the paper, published in *Cell,* of April 25, 1986. However, the panel was not charged with addressing, nor did it touch on, the squalid treatment O'Toole received from her mentors when she questioned the work of several superstars of contemporary science.

The concerns of O'Toole, who worked in the laboratory of one of the co-authors, Thereza Imanishi-Kari, were later brushed aside when she brought them to the attention of officials at MIT and Tufts, sites of the disputed research. When NIH took up the case last year, it appointed two colleagues of Baltimore to conduct an investigation, but canceled that move under fire from a Congressional investigation that culminated in a stormy hearing last spring (SGR, April 15: "Fraud Inquiry: Harsh Treatment for NIH on Capitol Hill"). The panel that produced the draft report was selected to avoid the initial appearance of conflict of interest.

Along with many critical comments about the paper,

(Continued on page 3)

Glasnost *Brings Closer Links For US, USSR "Psi" Research*

One of the less visible results of warming Soviet-American relations is expanded bilateral contacts in parapsychology. The subject is shunned as nuttiness in mainstream American science circles, but is regarded with interest in some parts of Congress and is reportedly a thriving field in the USSR.

"Psi" research, as it is often referred to, has long been an interest of Senator Claiborne Pell (D-RI), Chairman of the Senate Foreign Relations Committee. A member of Pell's staff, Scott Jones, who looks after the subject for the Senator, visited Moscow in September. His host

(Continued on page 2)

In Brief

NIH Director James Wyngaarden was advised that he came under the recent White House request for all Presidential appointees to submit *pro forma* resignations to clear the slate for the Bush Administration. But then he was notified that the incoming Administration wants him to stay put unless he would prefer to consider another government post. Wyngaarden, Director since 1982, told SGR he'll remain at NIH "at least into the summer" and possibly beyond that. "I think it's important," he said, "that the NIH Director doesn't change with the change of Administration."

Wyngaarden added that he's mystified by published reports that the Bush choice for NIH Director is Anthony Fauci, NIH AIDS chief and Director of the National Institute of Allergy and Infectious Diseases.

NSF Director Erich Bloch, also a Presidential appointee, has not submitted a resignation, but even if he did, it's considered likely that the new Administration would ask him to continue for at least the remaining two years of his six-year appointment. Exemption from transitional shifts is a point of pride among the NSF faithful, who stress that the six-year term was deliberately legislated to extend beyond the Presidential term and thereby minimize political intrusions on NSF.

Back at NIH, an insider, Samuel Broder, is the White House choice for Director of the National Cancer Institute. Broder, NCI Associate Director for Clinical Oncology, was among three names submitted to the White House by a search committee chaired by Wyngaarden. Nancy Reagan originally sought to put her own choice in the job, a California surgeon, but backed off under protests from the biomedical establishment (SGR Oct. 1).

. . . Psi Research Seeking Respectability in Washington

(Continued from page 1)

there was the National Center for Psychoneuroendocrinology Research, and one object of the visit was to participate in a conference on "Hidden Reserves of the Human Psyche." In the last session of Congress, Pell introduced a bill, S.J Res. 368, to establish a 23-member National Commission on Human Research, with a seat reserved for "an individual with training and experience in extraordinary human performance research."

Jones reports that, as a result of *glasnost,* "most of the old hands in open Soviet psychical research were now available and trying hard to reestablish Western contacts." At the "Department of Theoretical Problems," he reports, he was received by the Director, Dr. Erast Andriankin, and introduced to the "in-house psychic, Alla Kudryashova."

Psychic Research on Agriculture

The report continues: "They are doing research on her healing abilities and her ability to accelerate plant growth and influence yield per acre. Andriankin said he had a staff of 200." The research program, the report says, includes "investigating iridology, the claim that from distinctive narrow color bans in the iris of the eye, medical diagnoses can be made. The most important statement of research was that they had two major projects, 'psychotronics and religion' and 'psychotronics and art.' " Jones adds that because of translation difficulties he was unable to learn much about the projects, but hoped to find out more from Soviet researchers who are expected to attend the Seventh International Conference on Psychotronic Research, December 2-5, at West Georgia College.

Jones also reports meeting with a hypnotherapist, a leading Soviet cardiologist, a film maker who specializes in psi films, and another healer.

"My assessment of what is going on in this openness of old psychical researchers," he concluded, "is that they have been 'allowed' and instructed to reestablish their Western contacts, and attempt to enter into joint research efforts."

It's rumored off and on that the CIA and the Defense Department are supporting psi research, but while admitting that they did a bit of it years ago, they now deny any current involvement in the field.

At the National Science Foundation, where university-based psi researchers occasionally knock on the door, the official line is that all applications from academically qualified researchers are given respectful scrutiny. But one easily gets the impression that the NSF culture bunches the subject with perpetual motion, alchemy, spoonbending, and astrology.

But mainstream science values are not alone in this big country, as evidenced by Nancy Reagan's longstanding reliance on astrology on matters involving the President. Psi has an unmeasured but apparently sizeable following around Washington, where attendees at conferences on the subject include staff members from federal research agencies. They don't advertise their interest, since it would not be likely to assist a career in the federal bureaucracy. But they're constantly striving to give the subject respectability beyond its current core of believers—and most important, to obtain federal money for research.

The subject of paranormal research was included in a report, *Enhancing Human Performance: Issues, Theories, and Techniques,* that the National Academy of Sciences produced last year for the US Army. The report describes the "claimed phenomena and applications" as ranging from "the incredible to the outrageously incredible." It also reports a "presentation by several military officers" that "included discussion of psychic mind-altering techniques, the levitation claims of transcendental meditation groups, psychotronic weapons, psychic metal bending, dowsing, thought photography, and bioenergy transfer . . . . At the presentation, personal accounts were given of spoon-bending parties, in which participants believe they have caused cutlery to bend with the power of their minds, as well as instances of self-hypnosis to control pain and cure illness, walking barefoot on fire and handling hot coals without being burned, leaving one's body at will, and bursting clouds by psychic means."

The Academy reviewers said that two of the military officers who provided briefings on parapsychological techniques "described a variety of such phenomena that they felt had military potential, either as threats to security or aids to defense."

The reviewers politely concluded that "the large body of research completed to date does not present a clear picture."

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. . . NIH Panel Cites "Inconsistencies" in *Cell* Paper

(Continued from page 1)
the draft report also describes as inadequate a letter of correction that the co-authors published in the November 18 *Cell,* and recommends that the authors issue further corrections.

The paper, concerning gene expressions in transgenic mice, was disputed by O'Toole, she asserted, after she was unable to repeat portions of the reported experiments and found what she regarded as discrepancies in 17 pages of laboratory notes written by Imanishi-Kari. The draft report states that "The assay recorded in 17 pages of notebook data clearly is anomalous. Dr. Imanishi-Kari's explanation of radioiodination damage being responsible for the variability observed with this reagent is reasonable but unproven."

Possibility of "Significant Error"

The draft report also questions the appropriateness of designating all values in immunoassays above 1000 cpm as "positive binding" and below 1000 as negative. Taking note of questions raised on this point by Walter Stewart and Ned Feder, NIH inhouse researchers who, on their own volition, have switched to investigating misconduct as a major occupation, the panel draft states: "The clustering of values of 'positive' samples in the low numbers, however, suggests the cutoff might not have been appropriate. The implication is that the estimate of transgene expression . . . may be inaccurate." The panel added that the cutoff line could possibly have led to "a significant error."

The panel also expresses doubts about various other items, noting, for example, that "Characterization of the fine specificity of direct binding was apparently not done, even though some of the *Cell* paper's conclusions rely on this reagent." And it reports finding "inconsistencies" in assays included in the research paper, adding that, on the basis of its investigation, it concluded that "isotyping was not done, but was claimed to have been done."

The panel concluded that it had "found no reason to believe that these errors and omissions are intentional misrepresentations. Furthermore," it stated, "they do not aid in advancing the conclusions of the paper." Referring to the November 18 letter of correction to *Cell,* the panel report states that additional corrections are needed because "the corrective action taken by the coauthors does not fully meet with the recommendations of the panel . . . "

Still hovering over the case, with preparations underway for further inquiry, is the impresario of Congressional interest in the matter, Rep. John Dingell (D-Mich.), Chairman of the Energy and Commerce Committee—which writes legislation for NIH—and Chairman, too, of its Investigations and Oversight Subcommittee. Dingell, who has borrowed NIH's Walter Stewart to assist his inquiries into scientific misconduct, was raging last month about what he charged was a tipoff by NIH to the authors of the *Cell* paper concerning the findings of the expert panel (SGR, November 15). In any case, Dingell's staff is preparing for another hearing.

In a letter to the Secretary of Health and Human Services, parent agency of NIH, Dingell claimed that the November 18 letter of correction in *Cell* was designed to preempt the panel report. But if that was the intent, it apparently didn't work, given the panel's call for further corrections.

While the panel stuck to its charge to assess the accuracy of the paper and advise on necessary corrections, the basic issue firing up Chairman Dingell concerns the manner in which NIH responds to plausible allegations of misconduct. What's evident from this case, which was initially brought to NIH attention in early 1986, is that the response can be very slow. Also of concern to Dingell is the protection afforded "whistle blowers," a cherished species on Capitol Hill.

Does NIH Take It Seriously?

Another item of concern is the depth of NIH's seriousness in dealing with the misconduct issue. In upper echelon biomedical circles, it's regarded as a synthetic issue, hoked up by the press and a few dissident scientific malcontents. In response to Congressional rumblings about fraud in science, a conference circuit has been activated, meetings have been held and more are scheduled, and proceedings, reports, and recommendations have been coming off the press. A new academic line of work has thus been created, with ties that even extend abroad.

But on Capitol Hill, whose legislative inhabitants are steeped in examples of ethical shortcomings, the NIH response appears to many as merely a polite brushoff from the savants of science to the uninformed meddlers in Congress. Following Dingell's tumultuous hearing last spring on the disputed *Cell* paper, NIH restaffed its fraud office and pledged a new era of firm surveillance of ethical purity.

The new chief of the office is Mary Janet Newburgh, who came to the post from the NIH Institute of General Medical Sciences, where she was Deputy Director of the Pharmacological Sciences Program Branch.

In an interview in the NIH house organ, *The Record,* of November 1, she is quoted, in part, as saying, "I'm sure most of the cases are largely misunderstandings."—DSG

IBM's Gomory, Rumored for OSTP, Named to Head Sloan

Ralph E. Gomory, scheduled to retire in May from IBM, where he's Senior Vice President for Science and Technology, has been appointed to succeed the retiring Albert Rees as President of the Sloan Foundation. A public announcement of the appointment has not yet been made.

The Washington rumor mill lists Gomory as a strong possibility for White House Science Adviser in the Bush Administration, but so far the transition process has been silent on that post. Gomory is a member of the White House Science Council and has been closely involved with national science-policy issues. A Republican sci/tech mandarin tells SGR that if the White House beckons, he thinks Gomory would shift plans and accept.

Meanwhile, another name is being mentioned for the White House science post—Thomas D. Barrow, a former Vice President of Exxon. A geologist and a member of the National Academy of Engineering, Barrow is an old acquaintance of Bush.

Also in the mill is D. Allan Bromley, Professor of physics at Yale. He's been around the Washington committee circuit, but his lack of industrial experience is regarded as a handicap at a time when the nation's economic woes have shifted political attention from the nurturing of academic basic science to boosting the industrial payoff from federal investment in technology and engineering.

It's generally believed that the key person for picking the Science Adviser is John Sununu, named by Bush to be White House Chief of Staff. Sununu, retiring from the New Hampshire governorship, holds a PhD from MIT in mechanical engineering.

Since Bush was indebted to him for life-saving support in the vital New Hampshire primary, Sununu was the dream candidate among those who earnestly believe that few things are more desperately needed in national affairs than an intimate working relationship between the President and his Science Adviser. It is doubtful, however, that Sununu felt that that relatively minor post matched the IOUs he collected on the political trail.

Though the restorationists of White House science advice started clamoring over a year ago about the importance of having the Science Adviser on board at the very beginning of the new Administration to advise on recruiting and budgets, the smoothness of the Reagan-Bush transition has created an unforeseen situation. Long before Inauguration Day, the Reaganites have been informally yielding authority to Bush and his appointees—among whom there is not yet a Science Adviser.

Silence hangs over much of what is happening in this peaceable transfer of power, but it is clear that if Bush is to avoid an Inauguration Day stock-market and dollar-plunge calamity, he's going to have to cut federal spending by some substantial amount. It's likely that the targets for those cuts are now being worked out, so that the new President can swing into office with a decisive-looking manner. And there's no science type in the house to protect the vulnerabilities of the scientific community.

As one Republican veteran of national science-policy affairs put it to SGR recently: "We're four-sevenths through the transition period and we haven't heard anything."—DSG

Physics Education: AIP Report Details National Catastrophe

Repetition dulls the senses, which is the only explanation for the ho-hum response to the latest catastrophe report from the wastelands of science education.

Titled *Physics in the High Schools*, this one was produced by the American Physical Society in collaboration with the American Association of Physics Teachers. Based on a survey last year of physics teachers in 3478 public, private, and Catholic secondary schools (from a nationwide total of 21,700), the report echoes the dismal findings of many similar surveys in recent years:

- Only two-thirds of the schools offer physics every year, while another 17 percent offer it in alternate years. Ninety percent of these schools have only physics teacher, and 82 percent of them offer only a first-year course.
- Only twenty percent of graduates took a physics course, though 96 percent of students attend schools where some type of physics course is available.
- Funds for laboratory equipment and supplies in public schools average about $300 per physics class.
- Only one-fourth of the physics teachers hold degrees in physics.
- In comparative tests, the "cream of the crop" of students in American high schools were "near the bottom of the international ladder in terms of physics knowledge."

Analyzing the sparse presence of physics in American secondary education, the report states that "for 90 percent of students enrolled in the public schools, the character of the physics program—in terms of breadth and depth of the curriculum and the background and training of the teachers—seems very sensitive to the magnitude of enrollments in the subject. Small school size, low graduation requirements in science, students who have poor backgrounds in science and mathematics in earlier grades and who have low educational aspira-

(Continued on page 5)

. . . Science Proficiency Remains "Distressingly Low"

(Continued from page 4)

tions, all combine to keep absolute enrollment levels in physics low. Small enrollments, in turn, limit the variety of classes which can be offered, usually restricting the physics curriculum to the basic introductory class. They also limit the number of classes in all but the biggest schools, forcing the teacher to accept assignments in other areas to fill out his or her roster, or perhaps more often, causing a teacher from another speciality to be 'drafted' into teaching physics, frequently with little background in and enthusiasm for the subject."

The report adds that "the prospect of taking physics from an unenthusiastic and undertrained 'draftee,' combined with the course's reputation as an academically difficult subject, probably discourages many students from taking it, further reducing enrollments."

The physics report reflects the status of one of the most neglected subjects in the high school curriculum, but other fields of science aren't much better off. That's the gloomy finding of a report that preceded the physics dirge by a couple of months—*The Science Report Card*, a broad assessment of science in the schools. Produced by the Educational Testing Service (ETS), it concludes that "the average science proficiency across the grades remains distressingly low," and it adds that the science scores of today's average 17-year-old student "remains well below that of 1969." Over half of this age group, ETS states, "appear to be inadequately prepared either to perform competently jobs that require technical skills or to benefit substantially from on-the-job training."

Physics in the High Schools (66 pp., no charge). Order from: AIP Division of Education and Employment Statistics, 335 East 45th St., New York, NY 10017-3483; tel. 212/661-9260, ext. 326.

The Science Report Card (17-S-01; 151 pp., $14). Order from: National Assessment of Educational Progress, Educational Testing Service, Rosedale Rd., Princeton, NJ 08541-0001; tel. 609/921-9000.

In recent years, the state of science education has spawned a minor industry devoted to chronicling the disaster and raising alarms. According to ETS, "as many as 100 national reports have been issued calling for greater rigor in science education and suggesting numerous reforms." But ETS and others agree that little has actually changed.

There is no shortage of practical prescriptions for dealing with the problem of scientific illiteracy in a nation whose prosperity and defense depend upon scientific and technological proficiency. Colleges can radiate a beneficial influence on high schools by raising the science and mathematics requirements for admission. But the high schools can't respond without help to overcome the cycle of poorly trained, poorly paid, poorly supported teachers scaring off potential physics students.

The physics survey notes a comment from a respondent identified only as a "A teacher trained in England." It reads: "I am appalled at the lack of science education [in the United States] just in terms of the number of years that a subject is taught. How can physics be taught in a year to any depth? Worse is the fact that so many US students pass through high school and into the world with no idea of physics."

In Print

The following publications are obtainable as indicated—not from SGR.

The Science and Technology Resources of Japan: A Comparison with the United States (NSF 88-318; 69 pp., no charge), provides in one compact publication a wide variety of previously scattered or unavailable R&D data about Japan, with close comparisons with the US. Topics covered include funding patterns in government and industry, support of education, employment, patents and licensing, and output of scientific literature. Major points: Japan's support of R&D, while roughly half the total US figure, has been growing far more rapidly—up nearly five-fold in constant dollars between 1965-85, compared with 65-percent growth in the US; Japan spends less than one percent of its R&D funds on military work, whereas the US spends 30 percent, and in Japan, 2.9 percent of Gross National Product is devoted to civilian research, compared with 1.9 percent in the US.

Order from: NSF, Division of Science Resources Studies, 1800 G St. NW, Washington, DC 20550; tel. 202/634-4622.

R&D in the 1980s: A Special Report (33 pp., no charge), a review of federal R&D spending patterns, from Carter's fiscal 1980 and 1981 through the next-to-last Reagan year, FY 1988, prepared by the American Association for the Advancement of Science, Office of Public Sector Programs, shows that total R&D rose by 85 percent (or 26 percent in inflation-adjusted dollars), but the growth was extremely uneven as a result of Reaganite shifts: Overall, defense rose 83 percent in real terms while civilian R&D dropped 24 percent. The report, a valuable one for R&D statistics collectors, covers the major and minor federal R&D agencies, funding for university research, and trends in basic research support.

Order from: AAAS, Office of Public Sector Programs, 1333 H St. NW, Washington, DC 20005; tel. 202/326-6600.

(Continued on page 6)

In Print: Transition Issues, Science Curriculum, Etc.

(Continued from page 5)

Transition Series, 26 pamphlets, (GAO/OCG-89; 1 through 26TR; 15-40 pp., all free) from US Comptroller General Charles A. Bowsher, head of the General Accounting Office (GAO), sent uninvited to the President-elect, Speaker of the House, President of the Senate, and Director of the Office of Management and Budget, listing hundreds of alleged shortcomings (still festering, says Bowsher) that were turned up by the GAO in the course of its role as the investigative arm of the Congress.

Among the subjects covered are space, energy, information technology, resources for evaluation of federal programs, environment, foreign aid, and agriculture. There's no single report on R&D issues, nor, with a few exceptions, is much attention paid to them in the others, but the GAO collection provides a good summary of major and minor items on the coming political agenda.

Order from: USGAO, PO Box 6015, Gaithersburg, Md. 20877; tel. 202/275-6241.

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Science for Children: Resources for Teachers (176 pp., $7.95 for single copies; $6.50 each for 2-9; $4.95 each for 10 or more), a guide to curriculum materials, prepared by the National Science Resources Center, a joint creation of the National Academy of Sciences and the Smithsonian Institution; tells what is available, and how to order, for "hands-on" instruction in the life sciences, health and human biology, physical and earth sciences, etc.

Order from: National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20007-5575; tel. 202/334-3313.

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Two from Gale Research, Inc., publisher of directories of research organizations:

Research Centers Directory (1829 pp., two volumes, $380 per set), 13th edition, lists 10,300 research organizations (government, academic, industrial, private) in the US and Canada, with addresses, telecommunications numbers, senior officials, research focus, sources of support, publications, etc.

Government Research Directory (987 pp., $375), lists 3700 US government research facilities, with data as in the above entry.

Order from: Gale Research, Inc., Book Tower, Detroit, Mich. 48226; tel. 313/961-2242.

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Abstracts of Office of Health Technology Assessment Reports, 1987 (DHHS Pub. No. PHS 88-3429, 6 pp., no charge), from the federal agency responsible for advising Medicare on reimbursement for new health-care technologies. Identifying numbers and titles are: 87-1 "Transurethral Ureteroscopic Lithotripsy Procedure for Treatment of Kidney Stones"; 87-2 "Radiographic Absorptiometry for Measuring Bone Mineral Density"; 87-3 "The Cardiointegram in the Diagnosis of Coronary Artery Disease"; 87-4 "Chemical Aversion Therapy for the Treatment of Alcoholism"; 87-5 "Endoscopic Laser Photocoagulation in the Treatment of Upper Gastrointestinal Bleeding"; 87-6 "Cardiac Rehabilitation Services."

Order abstracts and full copies of the reports from: Publications and Information Branch, National Center for Health Services Research, Parklawn Bldg., Room 18-12, 5600 Fisher Lane, Rockville, Md. 20857; tel. 301/443-4100.

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From the Organization for Economic Cooperation and Development, two additions to OECD's series of examinations of R&D policies in member and associated nations:

Science, Technology and Innovation Policies: Yugoslavia (135 pp., $21). OECD "examiners" from Ireland, Italy, Finland, and Denmark waded into Yugoslavia's jurisdictional cacophony ("seven international boundaries, six Republics and two autonomous provinces, six nations, four principal languages, three main religions and two alphabets"), and concluded that "The scientific and technological system in Yugoslavia is excessively fragmented and most research activities lack the necessary 'critical' mass."

The Danish examiner (Morten Knudsen, Director General, Technological Institute, Copenhagen) was reported to have "noted the defensive reaction of the Yugoslav delegation and expressed some doubt about the capacity of Yugoslav society to go into action to reform itself, although the problems were clearly identified." The report continues: "In response to these remarks, Mr. Matic [President of the Federal Committee for Science and Technology] denied that the Yugoslav Delegation reactions were defensive."

Included are a description of the organization of Yugoslav science and technology and extensive statistical data on R&D expenditures, high-tech manufacturing, university enrollments, etc.

Reviews of National Science and Technology Policy: Austria (121 pp., $15.50). The OECD examiners noted that Austria lags behind several of its industrialized neighbors in R&D spending per capita—$137 in 1985 for Austria, compared with Switzerland, $428; Germany, $327; France, $265; Denmark, $154, but it was ahead of Italy, $123, and Australia, $139. Among the recommendations: a higher rate of growth in R&D spending and closer ties between basic science and industry. The OECD examiners also stated that the retirement age for professors, 70, was a barrier to scientific development.

Previous OECD Reviews of National Science Policy

(Continued on page 7)

In Quotes: Problems Arising from International R&D

From Science and Technology Policy Outlook 1988 *(110 pp., $18), by the Directorate for Science, Technology and Industry of the Organization for Economic Cooperation and Development, Paris-based policy-research consortium of the major non-Communist industrial nations.*

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The conjunction of numerous recent developments is accelerating the emergence of an international system of science and technology and shaping it in ways not generally anticipated.

Industrial firms are adopting new strategies for operating in global markets which greatly expand the extent of international collaboration in technology. The most prominent is a surge in the formation of alliances between companies from different countries for research, the development of new technologies and sharing of technical know-how. Such alliances have particularly concentrated in areas involving advanced technologies where costs and risks are often high....

Other kinds of commercial activities also add to the dense network of international relationships in science and technology. These include share investments in small foreign high-technology firms, the commissioning of research by institutions in other countries, the extensive use of international consulting firms and the vast expansion of commercial data bases and services for scientific and technical information.

Academic institutions are also more involved than previously in international activities, not only through their association with industrial firms, but also through direct cooperation between universities. Academic institutions often perform research under grants or contracts from foreign firms and provide consulting and educational services as well—a further indication of the growing international market for scientific knowledge.

These developments raise important issues to which governments may need to give greater attention. One is the balance countries should have between their domestic research efforts and their involvement in international cooperation. There is general agreement that scientific cooperation *per se* has a predominantly "positive sum" character and therefore should figure prominently in overall research efforts. This view is reinforced by the expanding opportunities for such cooperation and the possible efficiencies which might be attained, in the face of rapidly rising research costs....

A second and related concern is that areas of basic research on which advanced technologies depend could become less open to international cooperation if countries see collaboration as a threat to their international competitiveness. This could hamper research progress in these areas and related areas and require costly duplication of efforts in many countries.

Increasing international frictions—involving access to foreign research institutes and scientific meetings as well as issues concerning intellectual property, technical standards, and technology procurement policies—could also undermine international collaboration in science and technology which has traditionally been of considerable benefit to all countries.

(For ordering the OECD publication, see the OECD entry bottom left this page)

In Print

(Continued from page 6)

still available: ***Denmark*** (1988; 120 pp., $19.80); ***Sweden*** (1987; 112 pp., $13); ***Netherlands*** (1987; 142 pp., $20), and ***Finland*** (1987; 154 pp., $19).

Also available in the OECD series on Innovation Policy: ***Western Provinces of Canada*** (1988; 108 pp., $16.50); ***Spain*** (1987; 106 pp., $15); ***Ireland*** (1987; 76 pp., $10), and ***France*** (1987, 296 pp., $32).

OECD publications are sold at general bookshops and OECD offices in many major cities throughout the world. In the US: OECD Publications and Information Center, 2001 L St. NW, Suite 700, Washington, DC 20036-4095; tel. 202/785-6323. In France: OECD, Mail Orders, 2, rue Andre-Pascal, 75775, Paris; tel. 1/45.24.82.00. In Japan: OECD Publications and Information Center, Landic Akasaka Bldg., 2-3-4 Akasaka, Minato-ku, Tokyo 107; tel. 586.2016.

30 Environmental Groups Issue Agenda for New Administration

Blueprint for the Environment, produced in collaboration by 30 major conservation and environment organizations, was delivered last week to the Bush transition team and was discussed with the President-elect at a briefing on Wednesday. The 300-page report, embodying some 700 policy and procedural recommendations, is available for $13.95 per copy from: Howe Brothers, PO Box 6394, Salt Lake City, Utah 84106; tel. 1-800-426-5387. The report is also available on computer disks—3 1/2-inch MacIntosh: Word 3.0 or TEXT Formats, and 5 1/4-inch IBM: RTF or TEXT Formats. Price $99.50. Order from: Hughes Productions, PO Box 31, Silver City, Nevada 89428; tel. 702/847-9124.

Energy Department Ponders Lack of Fraud Cases

Allegations of scientific misconduct have been so heavily concentrated in biomedical research that wonder naturally arises about the dearth of reported sins in other disciplines. Curious about what might be termed the fraud gap, James F. Decker, then Acting Director, now Deputy Director, of the Office of Energy Research (ER) at the Department of Energy (DOE), assigned a review last spring to Bennett Miller, a former DOE research administrator. Miller, now a DOE consultant, responded in June with an internal memo, "Some Observations on Scientific Integrity"—a copy of which was recently sent to SGR by a helpful source. The study, it should be noted, focuses on DOE laboratory work, and does not deal with DOE's Olympian mendacity on nuclear safety, nuclear-test detection, and the Strategic Defense Initiative. Excerpts from Miller's memo follow, edited by SGR for brevity.

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Over the past several years there has been a disturbing number of incidents in which scientists have or have been accused of falsifying data to advance their careers and/or to build empires. Most of the incidents have been in the medical or biomedical sciences. You asked me to comment on whether the trend has infected or could infect the scientists ER supports. And, if not, why not? Have we been lucky? Should we think about additional or even new mechanisms to protect the sanctity of the scientific process?

I have now sampled opinion from around ER—primarily the associate directors—and also from outside ER. I conclude that there is little likelihood that the trend in medical/biomedical sciences will appear in ER . . . . I also conclude that we would be ill-advised to propose any additional mechanisms to guard against the possibility of infection from without. They are simply not needed....

The nub of my argument that nothing needs to be done at this time is the simple fact that nowhere in the collective memory of the people with whom I talked, memories that span the entire history of the Atomic Energy Commission, Energy Research and Development Administration, and DOE, a period in which ER funded research whose value in today's dollars is upwards of $50 billion, is there a single remembered case of scientific fraud involving the deliberate falsification of data in the physical or chemical sciences . . . .

Why is our record so good? Maybe physicists and chemists and metallurgists have more basic integrity than doctors, not to mention lawyers, developers, your local grocery clerk and the like. This is arrant nonsense. Venality is no less common in the hard sciences than in other elements of society. It just takes different forms . . . .

First, data in the hard sciences are generally obtained on purchased instruments whose performance is highly reproducible. Biomedical data are often obtained from living organisms that display the infinite variety that we know as life. It is simply harder in many cases to reproduce data gathered from living organisms than it is from crystal detectors and interferometers. One gaggle of geese is different from another, no matter how we try to standardize the process of selecting gaggles.

Second, in many of today's bigger science projects, like those in fusion and high-energy physics, the data are the result of group experimentation. Outright falsification requires an overt conspiracy among experimenters. This is highly unlikely . . . .

Group research is self-policing and individual research is subject to simple verification by independent analysis. Anyone foolish enough to falsify data in order to promote the notion of a breakthrough will be uncovered. To be sure, someone falsifying data for petty purposes may go unnoted, but so what?

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